Computer Science and Engineering
Indian Institute of Technology Kanpur

56th CONVOCATION

03rd July 2023

Dept. Convocation Brochure and Head's Report

Head of Department
Dr. Amey Karkare

Faculty Members
Dr. Amey Karkare (P)
Dr. Amitangshu Pal (AP)
Dr. Angshuman Karmakar (AP)
Dr. Anil Seth (P)
Dr. Arnab Bhattacharya (P)
Dr. Ashutosh Modi (AP)
Dr. Debadatta Mishra (AP)
Dr. Debapriya Basu Roy (AP)
Dr. Hamim Zafar (AP)
Dr. Indranil Saha (AsP)
Dr. Mainak Chaudhuri (P)
Dr. Manindra Agrawal (P)
Dr. Nisheeth Srivastava (AsP)
Dr. Nitin Saxena (P)
Dr. Piyush Rai (AsP)
Dr. Preeti Malakar (AP)
Dr. Priyanka Bagade (AP)
Dr. Purushottam Kar (AsP)
Dr. Raghunath Tewari (AsP)
Dr. Rajat Mittal (AsP)
Dr. Rajat Moona (P)
Dr. Sandeep Kumar Shukla (P)
Dr. Sanjeev Saxena (P)
Dr. Satyadev Nandakumar (AsP)
Dr. Soumya Dutta (AP)
Dr. Sruti S Ragavan (AP)
Dr. Subhajit Roy (AsP)
Dr. Sumit Ganguly (P)
Dr. Sunil Simon (AsP)
Dr. Surender Baswana (P)
Dr. Sutanu Gayen (AP)
Dr. Swarnendu Biswas (AP)
Dr. Urbi Chatterjee (AP)

Visiting Faculty Members
Dr. Arvind Verma (Indiana U.)
Dr. Gaurav Sharma (TensorTour)
Dr. Nisheeth Kumar Vishnoi (Yale U.)
Dr. Prateek Jain (Google Research)

Engineers
Brajesh Kr Mishra (Sen. Tech. Supt.)
Nagendra Yadav (Tech. Supt.)
Saurabh Malhotra (Senior Technician)
Meeta Bagga (Senior Technician)
Shweta Sachan (Junior Technician)
Akash Misra (Project Engineer)

Office Staff
Prashant Kr Sahu (Superintendent)
Rajesh Kumar (Dep. Project Manager)
Amit Kumar Bharti (Project Assistant)
Rishabh Dabra (Asst Project Manager)

Department Counsellor
Aradhana Yadav

Post Doctoral Fellows
Dr. Avaneesh Singh
Dr. Inzemamul Haque
Dr. Madhurima Mukhopadhyay
Dr. Pampa Howladar
Dr. Rachit Agarwal
Dr. Santosh Arvind Adimoolam
Dr. Shoubhik Chakraborty

Former (Visiting) Faculty Members
Dr. Adarshpal Pal Sethi
Dr. Ajai Jain
Dr. Amitabha Mukerjee
Dr. Ansuman Banerjee
Dr. Asish Mukhopadhyay
Dr. B. Srinivasan
Dr. Bhaskar Raman
Dr. Biswabandan Panda
Dr. C. R. Muthukrishnan
Dr. Dheeraj Sanghi
Dr. Gautam Barua
Dr. H. N. Mahabala
Dr. H. V. Sahasrabuddhe
Dr. Harish Karnick
Dr. Jithin K Sreedharan
Dr. Kesav Nori
Dr. Kritika Venkatramani
Dr. M. S. Krishnamurthy
Dr. Medha Atre
Dr. Nisheeth Kumar Vishnoi
Dr. Pabitra Mitra
Dr. Pankaj Jalote
Dr. Phalguni Gupta
Dr. Piyush P. Kurur

Dr. Ponnurangam Kumaraguru
Dr. Pramod Subramanyan
Dr. Prateek Jain
Dr. R. M. K. Sinha
Dr. R. Shankar
Dr. Rajiv Sangal
Dr. Ratan K. Ghosh
Dr. Sanjay G. Dhande
Dr. Sanjeev K. Aggarwal
Dr. Shashank K. Mehta
Dr. Shashank Singh
Dr. Somenath Biswas
Dr. Sumit Gulwani
Dr. Sunil Gupta
Dr. Swaprava Nath
Dr. T. V. Prabhakar
Dr. Tapas Nayak
Dr. V. M. Malhotra
Dr. V. Rajaraman
Dr. Vinay P. Namboodiri

Former Post Doctoral Fellows
Dr. Ayan Chakraborty
Dr. Jubin Mitra
Dr. Kripabandhu Ghosh
Dr. Mahendra Rathor
Dr. Mohammad Sultan Alam
Dr. Oswald C.
Dr. Prema S
Dr. Rakesh Ranjan Swain
Dr. Sankar Narayan Das
Dr. Zeyu Guo

दीक्षान्तोपदेशः

संस्मरन्तु भवन्तः भवदीयमिदं ज्ञानविज्ञानं राष्ट्रस्य पवित्रतमो निधिः। तस्माद् अस्योपयोगः स्वदेशस्य स्वशिक्षणसंस्थानस्य च गौरवानुरूपं सम्यग् विद्यातण्यः। कस्यामपि दशायां भवद्भिः स्वकीया व्यावसायिकी मर्यादा, चारित्रिकी महत्ता च सयत्नं संरक्षणीये। मनसा, वाचा, कर्मणा च सर्वथा लोक कल्याणाय प्रयत्नीयम्। अनुशासनप्रियैः सदा भाव्यम्। स्मर्यताञ्च श्रुतेर्वचनम्

"यानि अनवद्यानि कर्माणि तानि सेवितव्यानि नो इतराणि।"

EXHORTATION

Remember that your knowledge and intellectual attainment is the most sacred wealth of the nation. You shall therefore, use it an a manner befitting the honor and dignity of your country and of your alma mater. You shall make every effort, in all circumstances, to uphold the dignity of your profession and integrity of your character. You shall endeavor, in every way, through thought, word and action, to bring about the well-being of people. You must live a well-disciplined life. Never forget the commandment of the sacred scriptures:

"Thou shalt perform deeds that are commendable and no others."

Graduating Students
56th Convocation
2023
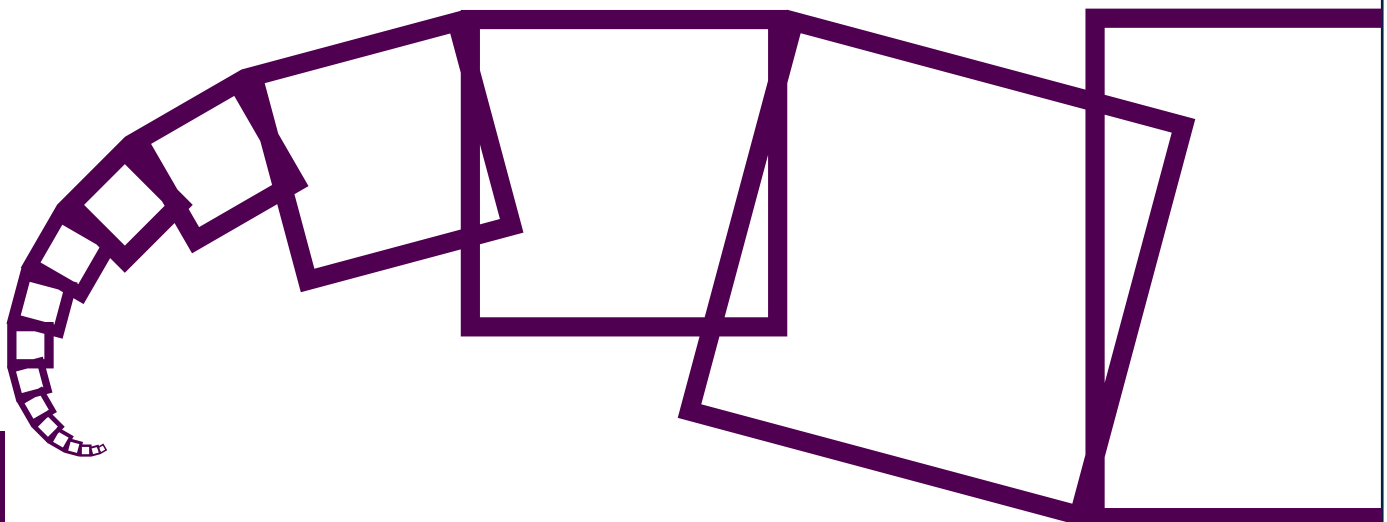
DOCTOR OF PHILOSOPHY (PhD)

PAWAN KUMAR (12211061)
Supervisor: Harish Karnick
Thesis Title: *Sequence-to-sequence Methods for Text Processing: Applications, Architectures, Optimization Methods*

TANMOY KUNDU (15211263)
Supervisor: Indranil Saha
Thesis Title: *Intelligent Battery Recharge Management for Mobile Robots*

SAURABH KUMAR (15211267)
Supervisors: Sandeep Shukla and Biswabandan Panda
Thesis Title: *Making the Case for Stealthy, Reliable, and Low-overhead Android Malware Detection and Classification*

PRATEEK VISHNOI (15511261)
Supervisors: Satyadev Nandakumar and Sunil Simon
Thesis Title: *Algorithmic Information Theory & Continued Fractions*

SIDDHARTH SRIVASTAVA (16211264)
Supervisor: T V Prabhakar
Thesis Title: *An Approach to Building Automatic Lecture Generation Systems*

PRANAV BISHT (17111268)
Supervisor: Nitin Saxena
Thesis Title: *Structural results on sparse factoring and identity testing*

JOINT DEGREE (MTech – PhD)

MAHESH SREEKUMAR RAJASREE (17111273)
Supervisors: Manindra Agrawal
Thesis Title: *Analysis of Symmetric-Key Cryptosystems and Subset-Sum Problem*

MASTER OF SCIENCE BY RESEARCH (MSR)

18111404   AVIJIT ROY
19111402   AMIT DHYANI
19111412   SHIWAM SINGH
19111416   SUVASREE BISWAS

MASTER OF TECHNOLOGY (MTech)

15511262	GUFRAN SIDDIQUI	20111042	PRASOON SAHU
20111001	ABHAS KUMAR	20111044	PREETI SINGH
20111002	ABHISHEK KRISHNA	20111045	PUSHPRAJ NAIK
20111003	MALLAMPET ADHILAKSHMI	20111047	RAHUL VARSHNEY
20111007	AKASH PATEL	20111050	KATARIYA ROHIT ARUN
20111008	AKASH JADHAV	20111051	ROHIT RAJ
20111010	AMAN PRATAP SINGH	20111053	JAIN SAKSHAM ANANT
20111012	AMIT KUMAR SHARMA	20111054	SAMBHRANT MAURYA
20111013	ANKITA DEY	20111055	SHARVARI AJAY OKA
20111015	CHANDAN KUMAR	20111056	SHASHWAT VAIBHAV
20111020	GAUTAM CHAUHAN	20111058	SHIVAM AGGARWAL
20111021	HARSIKA DIKSHA	20111059	SHOBHIT SINHA
20111022	HIRAK MONDAL	20111061	SHRUTI SHARMA
20111025	JAYESH PATIDAR	20111063	SHUBHAM KUMAR
20111029	MAHI AGRAWAL	20111064	SONAM TSHERING
20111030	MANI KANT KUMAR	20111065	SREEJIT BOSE
20111031	MANISH YADAV	20111066	SUMESH KUSHWAHA
20111032	MAYANK BANSAL	20111067	GADE SWAPNIL SANJAY
20111033	MOHAMMED NOMAN AZAM	20111068	TAMAL DEEP MAITY
20111034	MOHIT KUMAR	20111070	BOPPANA TEJ KIRAN
20111035	VORA MOKSHA KULDIPBHAI	20111071	TUSHAR GAUTAM
20111036	MUSKAN RATHORE	20111072	VISHAL KUMAR
20111037	NAGA DURGA KRISHNA MOHAN EATY	20111073	YASH SARASWAT
		20111075	AVI SOMANI
		20111076	ASHANKUR TRIPATHI
20111038	LEO EVENSS P J	20111078	SANDEEP KUMAR MISHRA
20111039	PARTH SHARMA	20111077	GAURAV SINGH PARIHAR

DUAL DEGREE (BTech – MTech)

15807267	HARSH NARANG
17807077	ALAN NAIR
17807481	PRAJWAL H G
17907825	YATIN DANDI
18807259	FARZAN ADIL BYRAMJI
18807615	RISHIK JAIN

BACHELOR OF TECHNOLOGY (BTech)

170232	DEEPAK KUMAR		190162	ANSHUMANN
170760	TUSHAR CHAHAR		190163	ANTREEV SINGH BRAR
180054	AKASH DAYANAND CHAVAN		190164	ANUBHAV KALYANI
180143	ARYAN SALUJA		190175	ARKA DAS
180151	ASHOK VISHWAKARMA		190177	ARPIT SINGH
180304	INDRANI NEKKILI		190185	ARYAN KUMAR
180346	KARTIK RAJIV NIRMAL		190186	ARYAN MUNDADA
180402	MANASH BAUL		190195	ASHOK KUMAR SAINI
180434	MOTA JITENDRA		190198	ASMITA NIMESH
180454	NAKUL JAIN		190200	ATHARV SINGH PATLAN
180472	NIDHI HEGDE		190201	ATREYA GOSWAMI
180503	PARTH SOMANI		190203	ATUR GUPTA
180623	ROHIT KULHARI		190213	AYUSH KUMAR
180661	SAMYAK JAIN		190224	BANAVATHU MEENA
180766	SIRIPURAM RAHUL		190228	BASHABOYNA VASAVI
180778	SOURABH KULHARI		190229	BHAGWAT GARG
180830	UDIT KUMAR JAREDA		190239	BISWESWAR MARTHA
180870	VIRAJ RAVJIBHAI LIMBASIYA		190241	BOMMAREDDY INDRA SENA REDDY
190002	A KEDARNATH		190257	DEEKSHA VIJAY
190006	AAKASH LAWA		190266	DEESARI SAI DURGA GANESH DORA
190017	ABHAY MISHRA		190274	DEVANSHU SINGLA
190037	ABHISHEK GURJAR		190304	DINESH RAM
190054	ADIT KHOKAR		190306	DIPANSHU GARG
190057	ADITI GOYAL		190309	DIVYANSH GARG
190066	ADITYA PRAKASH		190322	DRAVYA MARWAHA
190082	AKASH KUMAR BHOI		190327	GAGAN ARYAN
190090	AKSHAT SHARMA		190330	GANJI BHAVANI
190093	AKSHAY GUPTA		190337	GAURAV KUMAR
190106	AMAN JAISWAL		190349	GURBAAZ SINGH NANDRA
190108	AMAN RAW		190350	GURUGUBELLI NAVYA
190117	AMIT KUMAR SINGH		190353	HARDIK SHARMA
190128	ANANYA GUPTA		190354	HARIOM SHAKYAWAL
190131	ANCHAL GUPTA		190379	HIMANSHU POTHAM SHETTY
190147	ANJALI RANA			
190158	ANSHIT ARYA			

BACHELOR OF TECHNOLOGY (BTech)

190381	HIMANSHU SOOD	190704	RISHABH MUKATI
190418	KARTIK JHANWAR	190739	SAKET DHAKAR
190424	KAUSTUBH VERMA	190758	SANJAY PANDER
190428	KETAN CHATURVEDI	190759	SANJAY SUKUMARAN
190432	KHYATHI VAGOLU	190769	SARTHAK GOTHALYAN
190434	KINDINTI UDAY KIRAN	190772	SARTHAK ROUT
190440	KRITIN SHARMA	190784	SAURAV KUMAR
190457	LIPI JAIN	190792	SHANTANU S THAKUR
190475	MANDAR BAPAT	190802	SHINDE ANKIT JAGDISH
190477	MANISH	190810	SHIVAMSHREE GUPTA
190482	MANISH MAYANK	190824	SHREYASI PRASAD
190503	MOHD MUZZAMMIL	190828	SHUBH AGRAWAL
190524	NAKUL JINDAL	190833	SHUBHAM KUMAWAT
190527	NAMAN GUPTA	190835	SHUBHANKAR GAMBHIR
190535	NAVEEN KUMAR MATHUR	190848	SOMYA LOHANI
190547	NIKET JAIN	190866	SUBHROJYOTI CHATTERJEE
190549	NIKHIL MEHTA	190870	SUHAS S
190553	NIKITA CHAUHAN	190882	SURAJ PRAKASH
190562	NISHIMA PANWAR	190902	TARUN KANODIA
190593	PATIL ADITYA BHARAT	190908	TEJESH VAISH
190600	PIYUSH AGARWAL	190915	TUSHAR
190622	PRANAV SINGH	190918	TUSHAR SINGLA
190646	PRINCE KUMAR AHIRWAR	190924	URBI GHOSH
190652	PRIYANSHU YADAV	190928	UTKARSH JAIN
190657	PYLA VENKATA SRI LEKHA	190933	V PRAMODH GOPALAN
190667	RAHUL RATHOD KETHAVATHU	190940	VANGALA KRISHNA SAI
		190941	VANSH BANSAL
190684	RAKESH TETARWAL	190943	VARENYA SRIVASTAVA
190701	RISHABH DUGAYE	191178	YATHARTH GOSWAMI

eMasters

22157001	ABHISHEK PATTANAIK	22157042	SHARMA PANKAJ
22157002	ABHISHEK TAMRAKAR	22157044	PRADEEP KUMAR MISHRA
22157003	ABHISHEK YADAV		
22157010	ANUJ JAISWAL	22157048	RAHUL GARG
22157014	AVINASH KUMAR	22157050	RAJVIDHYA KHER
22157018	CHITRE KEDAR RAVINDRANATH SANGITA	22157051	RIHANA SADIKALI SHAIKH
		22157052	SAGAR PRIYADARSHI
		22157053	SAGAR SENGUPTA
22157027	KARANDIP SINGH	22157061	SUGHOSH PANDEY
22157029	SUDARSHAN M N	22157062	SUMAN MANDAL
22157040	DWIVEDI PANKAJ TARASHANKAR	22157067	TRIPATHI NISHTHA RAJENDRAKUMAR
22157041	PANKAJ PATNI	22157073	VINEET SINGH

DOUBLE MAJOR (BTech)

180378	LAKSHA Y RASTOGI (BSBE)	180061	AKSHAN AGRAWAL (ME)
180178	AYUSH SHAKYA (CHE)	180606	RIKESH SHARMA (ME)
180771	SOHAM GHOSAL (CHE)	180608	RISHABH KOTHARY (MTH)
180050	AKANSH AGRAWAL (EE)		
180564	PULKIT GOPALANI (EE)		

All students listed above got their second major in CSE. The department of their first major is indicated within the parentheses.

Awards and Honors
56th Convocation
2023
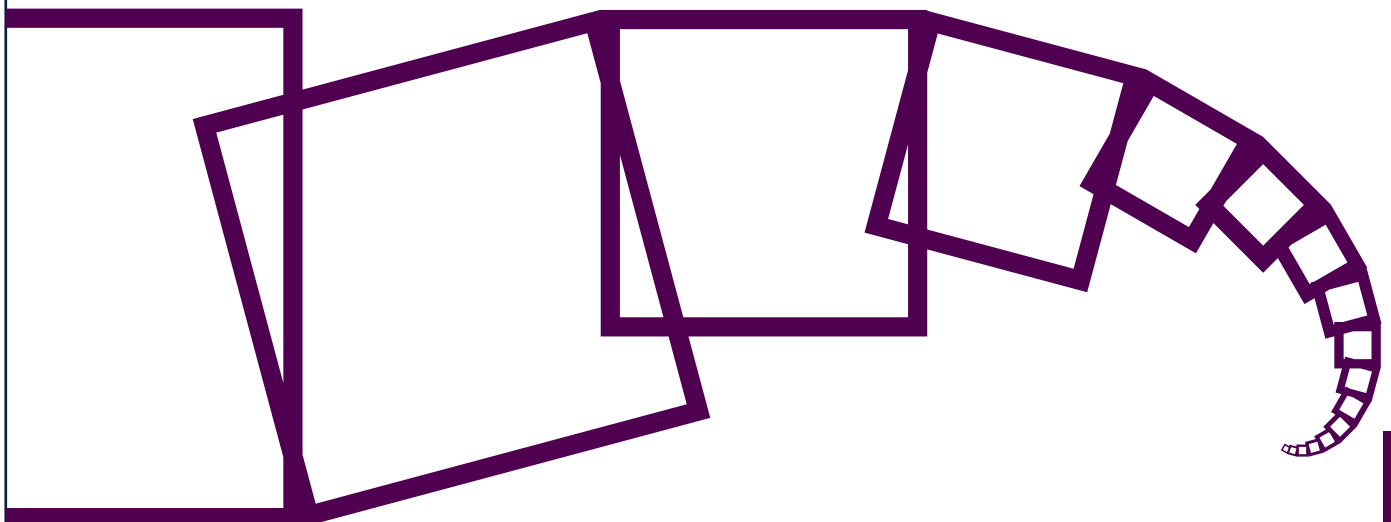
List of Awardees

PRESIDENT'S GOLD MEDAL

For the best academic performance among the graduating students of all disciplines in all the 4-year / 5-year undergraduate programmes

18807259   Farzan Adil Byramji

DIRECTOR'S GOLD MEDAL

For outstanding all round achievement and leadership among all the students graduating in 4-year undergraduate programmes

190128   Ananya Gupta

OUTSTANDING PH.D. THESIS AWARD

For the best thesis in Doctor of Philosophy programmes in each department

16111262   Bhaskar Pratim Mukhoty

GENERAL PROFICIENCY MEDAL

For the best academic performance among the graduating students of all 4-year/5-year and 2-year M.Sc. programmes in each of the departments

18807259   Farzan Adil Byramji

PROFICIENCY MEDALS

For the best undergraduate project work done by graduating students in the 4-year/5-year and 2-year M.Sc. programmes in each of the departments

190503   Mohd Muzzammil
190017   Abhay Mishra

SRI BINAY KUMAR SINHA AWARD

For the best undergraduate project of any department that has industrial applicability and partially/completely solves a problem affecting the common people

190057   Aditi Goyal

CHANDRA PRABHA AND CHARAN DASS GUPTA GOLD MEDAL

For the best academic performance among all graduating female students in 4-year undergraduate program in any Engineering department

190057   Aditi Goyal

BEST SOFTWARE AWARD

For the best software developed by any graduating student or a group of students of any discipline

190017   Abhay Mishra
190503   Mohd Muzzammil

List of Awardees (continued)

PROFESSOR PUTCHA VENKATESWARLU MEMORIAL GOLD MEDAL
For the best academic performance among all the graduating 4-year undergraduate students

190322   Dravya Marwaha

RADHABAI VASUDEO NAVELKAR AWARD
For the best graduating girl student of the 2-year MTech programme in the Computer Science & Engineering department

20111021   Harsika Diksha

KANTA DEVI MALIK MEMORIAL AWARD
For the best academic performance among all graduating 4-year BTech girl students

190057   Aditi Goyal

IITK EXCELLENCE FOR LEADERSHIP IN STUDENT'S AFFAIRS
For outstanding work in various fields of art and cultural activities

190524   Nakul Jindal

DR. RUKMINI SARASWAT GOLD MEDAL
For the best all-rounder among female students graduating in all 4-year/5-year programmes

190128   Ananya Gupta

RAJIV AND RITU BATRA STUDENT AWARD IN CYBER SECURITY
Given to the students graduating from M.Tech. or MS(Research) in the Cyber Security domain
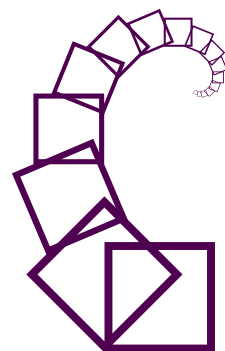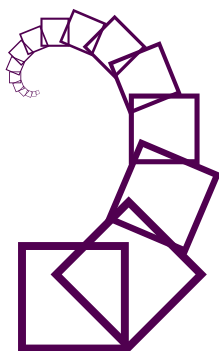
18807615   Rishik Jain

Guest of Honor
56th Convocation
2023
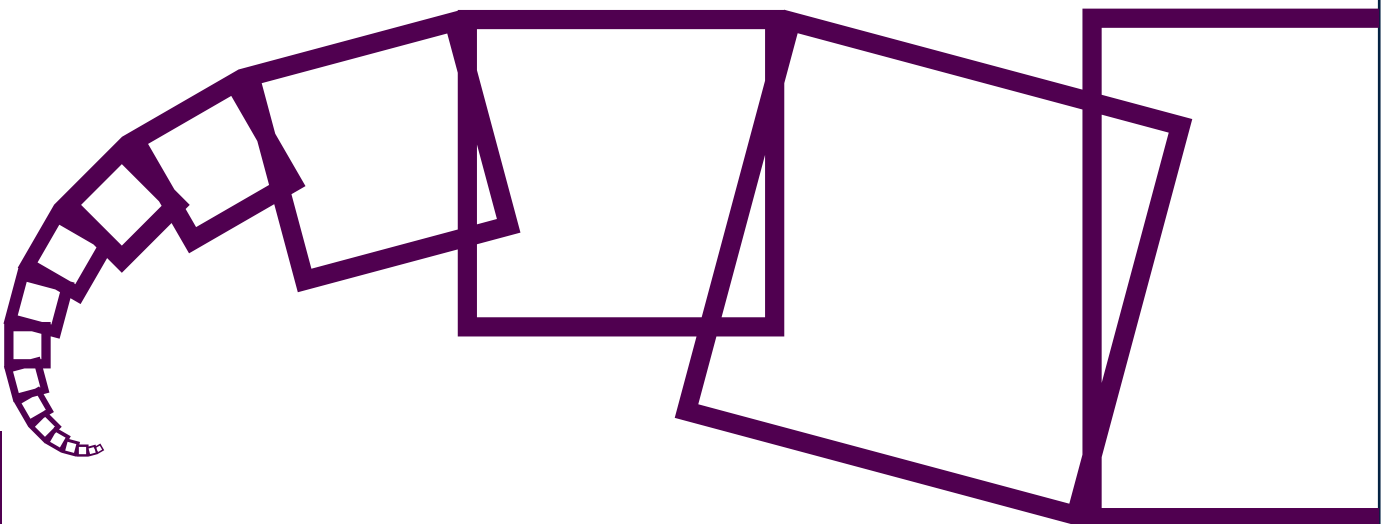
FIFTY SIXTH CONVOCATION
03 JULY 2023

Guest of Honor for the
## Department of Computer Science and Engineering

Dr Neeraj Kayal
Principal Researcher, Microsoft Research

Neeraj Kayal is a Principal Researcher at Microsoft Research as well as an alumnus of IIT Kanpur (BT CSE 2002). He obtained his PhD from IIT Kanpur as well (PhD CSE 2007) and has held postdoctoral positions at the Institute for Advanced Study, Princeton and at DIMACS (Rutgers University). He works in the areas of complexity theory, algorithms, and related areas of theoretical computer science. He is most well-known for discovering, in joint work with his advisor Dr. Manindra Agrawal and Dr. Nitin Saxena, the first deterministic, unconditionally polynomial-time algorithm for primality testing. Their work won the Godel Prize (2006) and the Fulkerson Prize (2006). He has received several other awards over the years including the Infosys Prize in Mathematics in 2021 and the Young Scientist Award from Indian National Science Academy in 2012. His recent work has been focused on algorithms and lower bounds in algebraic complexity theory for which he received the Infosys Prize. Most recently, he has been working on unsupervised learning.

Head's Report
2022-2023
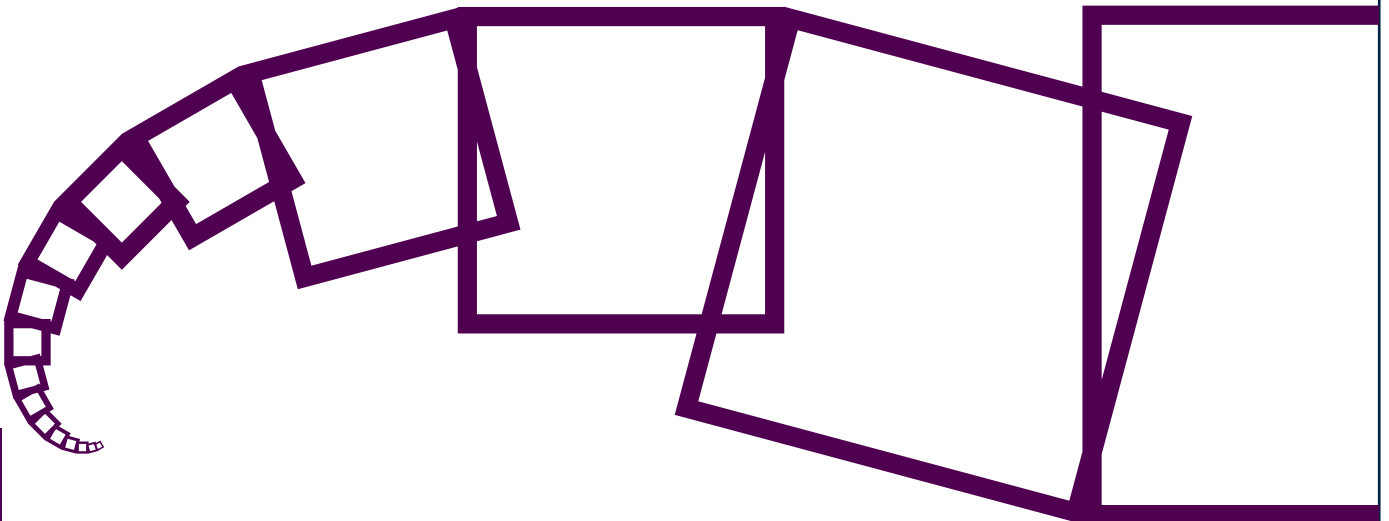
Head's Report

To the graduating batch of students, their family and friends, and to our guest of honor Dr. Neeraj Kayal, I extend a warm welcome at this 56th Convocation of the Indian Institute of Technology Kanpur. I am pleased to offer my congratulations to all graduating students. I extend a special commendation to all award winners for achieving excellence in their chosen discipline. We are delighted that this year, our graduating students have won a total of 14 convocation awards including the coveted President's Gold Medal and Director's Gold Medal. They have also shown immense versatility by winning not just academic awards but also awards that recognize research with industrial applicability, and outstanding work in cultural activities.

Department Strength and Intake

In the academic year 2022-23, the department admitted a total of 116 PG students (21 PhD, 11 MS and 84 MTech) as well as 132 BTech students. 73 students were admitted into the e-Masters program in cybersecurity.

Graduation

A total of 215 students will be graduating today from the CSE department. Among them are 6 PhD, 1 MTech-PhD (joint degree), 4 MS by Research, 52 MTech, 6 BTech-MTech (dual degree), 125 BTech and 21 eMasters students. Additionally, 8 students will be graduating with a second major from the CSE department. The number of graduating students has seen an overall 63% increase since last year.

Degree	Recipients
PhD	6
MTech-PhD	1
MSR	4
MTech	52
BTech-MTech	6
BTech	125
eMasters	21
Double Major	8
Total	**215 + 8**

Placement

The department continues to enjoy superlative placement outcomes, with a placement rate of 95.3% in 2022-23. The outcomes are similarly excellent across programs with 95.3% and 95.6% students in UG and PG programs respectively getting placed through SPO drives. The total number of students placed experienced a 13% increase as compared to 2021-22.

R&D Activities

Our department members are carrying out more than 50 consultancy and sponsored research projects with a total funding of more than 130 crores obtained from corporate bodies, government agencies and philanthropic organizations. The number of projects and the total volume of funding have both witnessed a significant year-on-year jump. It is notable that these projects often target problems of national importance such as the SATHEE project that is developing a DTH, Web, and Mobile-based portal to help students prepare for exams like JEE Mains, NEET, CLAT, ICAR UGEE, SSC, RRB, Banking etc. Other projects are working on equally impactful areas such as AI-based air quality monitoring and the Jal Jeevan mission. I would like to take this opportunity to highlight two research centers set up by CSE faculty that have seen a sharp rise in prominence in recent years. The first is the C3i center that focuses on developing cybersecurity solutions and tools. The center is involved in several projects of national importance such as the National Blockchain Project. The second center that was established more recently is the CDIS center which focuses on rapid development of AI-based software systems. Despite being a relatively new center, CDIS has already executed several big-ticket projects such as setting up an intelligent grievance management system for the ministry of defense for which it received an award at the National e-Governance Awards last year. More details about these centers are available in the convocation brochure.

Teaching

The CSE department recently introduced two new degree programs, namely MTech in cybersecurity and MS (by Research) in cybersecurity. A total of 30 students were admitted to the inaugural batches of these two programs in 2022. These programs are carefully designed to expose students to the cutting edge in cybersecurity, enabling them to take up challenging roles to fulfill the ever-growing cybersecurity needs of the nation. Four new courses were introduced in the last year in areas such as post-quantum security, sensing and data analytics, including a course on large data analysis and visualization jointly offered by two faculty members. Apart from the introduction of new courses, the department continues to sustain offerings of its vast array of existing courses with a total of 50 courses being offered in the academic year 2022-23. It is notable that most of these offerings were PG electives (35) with a smaller number being UG core and elective courses (15). Our PG course offerings place emphasis on all major as well as

emerging areas of computer science including AI, machine learning and data science (13 offerings), cyber security and the internet of things (10 offerings), systems research (4 offerings) and theoretical computer science (8 offerings). A total of 115 projects were completed by UG students under the supervision of various faculty members as a part of the UGP courses. Our class sizes continue to grow given the increased demand for instruction in areas such as cybersecurity and AI. Our average and median class strengths in the past year were approximately 90 and 50, respectively. More than 15 of the course offerings had more than 100 students each with our largest PG course offering having more than 500 students.

New Faculty Members and Postdoctoral Fellows

The department welcomed three new faculty members in the past year with diverse interests such as Post Quantum Cryptography, Big Data & Visualization, and Human Factors in Computing. Our new members have a unique focus on both fundamental as well as applied aspects of research in their chosen areas. The department currently hosts 4 visiting faculty members and 7 postdoctoral fellows. Our postdoctoral fellows, 4 of whom joined in the past year itself, are conducting research in cutting-edge areas such as AI for air-quality monitoring, ubiquitous computing, cybersecurity and blockchain, formal methods, and human-computer interaction.

Outcomes and Achievements

Our department members published more than 100 journal and conference papers in the past year, with multiple publications at top venues across subdomains such as theory (FOCS, STACS, ICALP), systems (CAV, HiPC, CP, DATE) and the data sciences (AAAI, IJCAI, CVPR, ACL, COLING, KDD, SIGIR and NAACL, CogSci). Our students and faculty members continue to bring laurels in the form of fellowships of national academies, best paper awards and nominations, best teacher awards, corporate fellowships, scholarships and research grants. For instance, Dr. Nitin Saxena was elected a fellow of INAE, Dr. Hamim Zafar received the prestigious DBT/Wellcome Trust India Alliance Early Career Fellowship, and 4 of our PhD students were awarded the Prime Minister's Research Fellowship. A list of prominent achievements by department members is available in the convocation brochure.

The Changing World

We live in a fast-changing world where multiple factors, such as the advent of highly accurate generative AI, are set to change the way we do our jobs as well as lead our lives. The key to success in such a world is to embrace the spirit of curiosity, learning and inquiry. Your respective degree programs may conclude today but the process of learning should not. Whichever career path you choose for yourself, remember to aim high and seek excellence on every single day and in every single thing you do. Achievements are almost always an outcome of sustained and consistent effort and seldom a result of isolated effort. The knowledge, enthusiasm, energy, and new ideas you carry with you are valuable assets. Make sure that you use these fruitfully to benefit your family, your society, the nation and the entire humanity. I wish to conclude congratulating the graduating students once again and wishing them the best in all their future endeavors.

-- Amey Karkare

New Courses Introduced

Course	Proposer	Year
Big Data Visual Analytics	Dr. Soumya Dutta	2022
Topics in Large Data Analysis and Visualization	Dr. Preeti Malakar and Dr. Soumya Dutta	2022
Sensing, Communications and Networking for Smart Wireless Devices	Dr. Amitangshu Pal	2022
Post Quantum Security	Dr. Debapriya Basu Roy	2022

Notable Achievements

Fellowships and Editorships

- Dr. Nitin Saxena was elected to the Fellowship of the Indian National Academy of Engineering (INAE).
- Dr. Indranil Saha was invited to the Program Committees of ICCPS 2023, EMSOFT 2023, ATVA 2023, RV 2023.
- Dr. Indranil Saha was made Guest Associate Editor for Special Issue of ACM TECS on Formal Methods and Models for System Design

Student Scholarships

- Four PhD students Abhinav Joshi, Musale Krushna Pavan, Nanda Rani, and Neelofar Hassan received the Prime Minister's Research Fellowship (PMRF) for their doctoral studies at IIT Kanpur.
- PhD student Prantik Chatterjee received the Intel India Research Fellowship.
- PhD student Nanda Rani was awarded the Raman-Charpak Fellowship.

Research Grants

- Dr. Hamim Zafar received the prestigious DBT/Wellcome Trust India Alliance Early Career Fellowship.

Teaching Awards

- Dr. Piyush Rai was chosen by the CSE graduating batch of 2022 to receive the distinguished teacher award.
- Dr. Sumit Ganguly received the Excellence in Teaching Award.
- Dr. Rajat Mittal received the 1989 Batch Faculty Award in recognition of his contributions to improving undergraduate teaching.

Research Awards

- A team consisting of Dr. Nisheeth Srivastava and Dr. Piyush Rai won the Silver Award under the category "Outstanding research on Citizen Centric Services by Academic/Research Institution" of the National Awards for e-Governance Scheme 2021-2022.

Research Awards (continued)

- A paper by PhD students C. S. Bhargav, Sagnik Dutta and Dr. Nitin Saxena won the best student paper award at MFCS 2022.
- Dr. Indranil Saha and his co-authors won the Best Repeatability Evaluation Award at HSCC 2023.
- A paper by Dr. Jithin K Sreedharan and coauthors won an outstanding paper award at the symposium on Machine Learning for Health.
- A paper by students P. Mohan Anand, P. V. Sai Charan, and Dr. Sandeep K. Shukla won the best student paper award at the 2022 IEEE International Conference on Cyber Security and Resilience.
- A paper by students Sharath Padmanabha, Fahad Shaikh, Mayank Bansal, Debanjan Chatterjee, and Preeti Singh and Dr. Purushottam Kar and Dr. Amey Karkare won the best paper award at the Innovations in Software Engineering Conference (ISEC), 2023.
- A paper co-authored by postdoctoral scholar Dr. Arvind Adimoolam and Dr. Indranil Saha received a best paper nomination at HSCC 2022.
- A paper by PhD student Amit Chandak and Dr. Purushottam Kar and Dr. Piyush Rai was selected as the four best paper award nominees at the International Conference on Data Science and Management of Data (CODS-COMAD), 2023.
- A paper by students Abhinav Joshi, Areeb Ahmad, Umang Pandey and Dr. Ashutosh Modi won the best paper runner up award at the Language and Reinforcement Learning (LaREL) workshop at NeurIPS, 2022.
- Dr. Urbi Chatterjee was selected as one of the best reviewers for the ACM CCS 2022 conference.

New Faculty Members

Dr. Angshuman Karmakar
Research Areas: *Post Quantum Cryptography, Side-Channel attacks and Computation on encrypted data and Cryptology*

Dr. Soumya Dutta
Research Areas: *Big Data Science & Visualization, Machine Learning for Visual Computing, Statistical Techniques for Big Data, High Performance Computing and Visualization, Scientific Visualization, In Situ Analysis and Human-Computer Interaction*

Dr. Sruti S Ragavan
Research Areas: *Human Factors in Computing, Software Engineering and End-user Computing*

R&D Centers
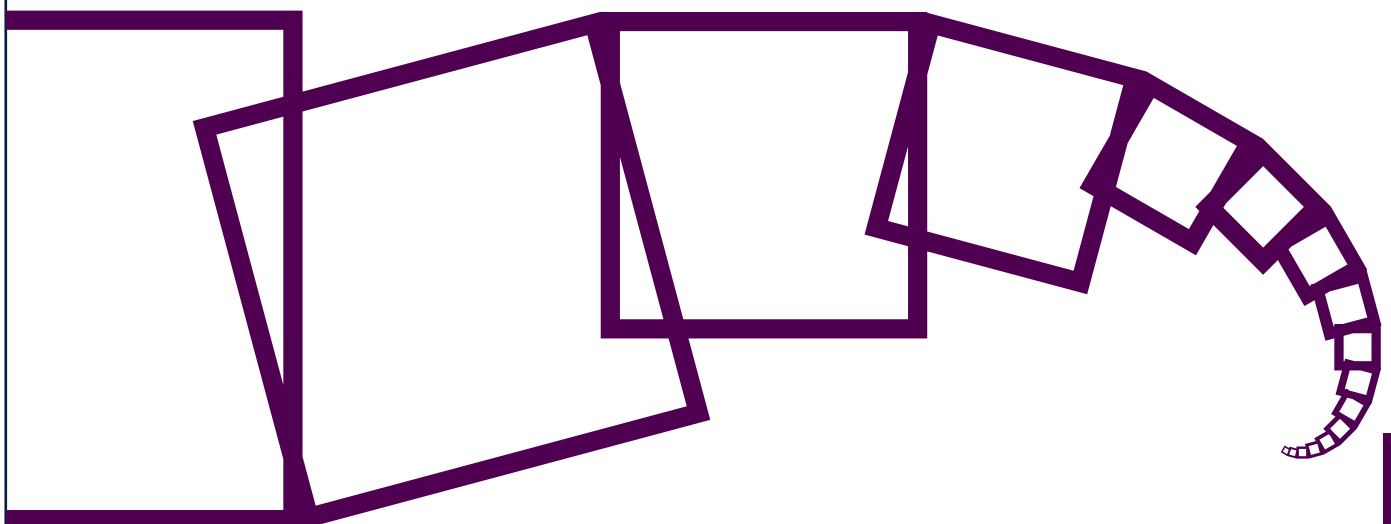
CDIS: Center for Developing Intelligent Systems

https://www.iitk.ac.in/cdis/

CDIS is an R&D Center dedicated to rapid development and prototyping of intelligent software systems with an emphasis on problems arising within the Indian ecosystem. The center is headed by Dr. Nitin Saxena and Dr. Nisheeth Srivastava and employs 4 dedicated engineers. The center also has more than a dozen associated faculty members contributing to various projects. CDIS is a unique initiative and despite being in its nascency, has already executed major projects with national impact.
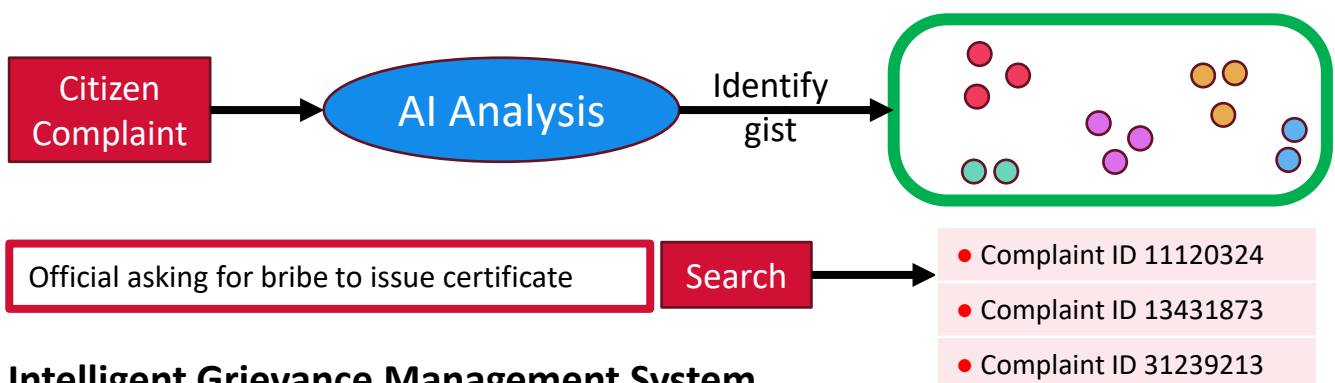
Intelligent Grievance Management System

CDIS has deployed a novel search engine for public grievances at the Ministry of Defense that allowed ministry officials to address citizen grievances more effectively by identifying systemic problems, performing root cause analysis, etc. Impressed by its effectiveness, the PMO has asked CDIS to implement the system across all government departments and ministries. The system also won the *Silver Award* under the category "*Outstanding research on Citizen Centric Services by Academic/Research Institution*" of the National Awards for e-Governance Scheme 2021-2022.

AI-based Forensics

CDIS is helping the National Health Scheme use AI to detect fraud in insurance claims. The tool developed at the center analyzes scanned images of hand-filled forms and uses AI to detect anomalies.

Haryana Parivar Pehchan Authority

CDIS is helping the Haryana state government integrate their data to estimate income of Haryana citizens to determine their eligibility for public benefits and services they may be eligible for, but don't know it yet. This will enable a unique push-based delivery for government welfare schemes.

C3i: Center for Cyber Security and Cyber Defense for Critical Infrastructure

https://security.cse.iitk.ac.in

The C3i center is a national interdisciplinary center funded by SERB and is India's first lab with industry-scale testbeds for cyberphysical systems. Associated with this center is the C3i Hub which is a technology and innovation hub funded by DST. Some major initiatives of the center follow.

National Blockchain Project (https://blockchain.cse.iitk.ac.in/)
The project is developing blockchain based e-governance solutions.
The major threads being pursued under this project include

- *Blockchain Based Land Record Registry*: part of the Kaveri Blockchain Project, State of Karnataka
- *Blockchain Based e-Procurement*: in collaboration with Department for e-governance, State of Karnataka (already in operation)
- *Self-sovereign Identity* (SSI): digital degrees are being issued to graduating students at IIT Kanpur, IIT Indore, IGNOU, and NIT Rourkela
- Developing tools for cryptocurrency blockchain forensics

Apart from this, some other key projects at the center include projects on hardware security, IoT and other cyberphysical systems.
1. Indo-Israel Project on Anomaly Detection based Intrusion Detection in Cyber Physical Systems
2. Indo-UK Clean Energy Initiative Project on Prediction of Solar Outputs
3. Engineering of Security Hardened Cryptographic Hardware for Critical National Infrastructure
4. Fmsafe: A Network Centre For Formal Methods in Validation and Certification Procedures for Safety Critical ICT Systems
5. Coresafe: A Formal Approach Against Code Replacement Attacks on Cyber Physical Systems
6. Advanced Cybersecurity System And Research Center at the NHAI

The center also actively publishes at leading venues. The center has 75+ publications to its credit including 3 books, 4 book chapters, 50+ conference and 15+ journal papers.
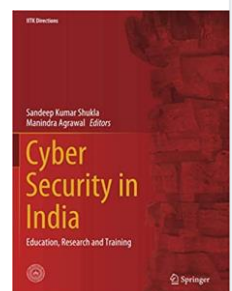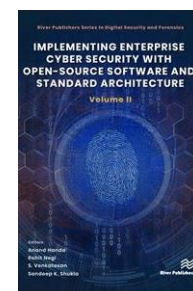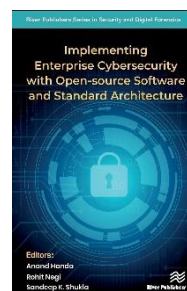
Select R&D Projects
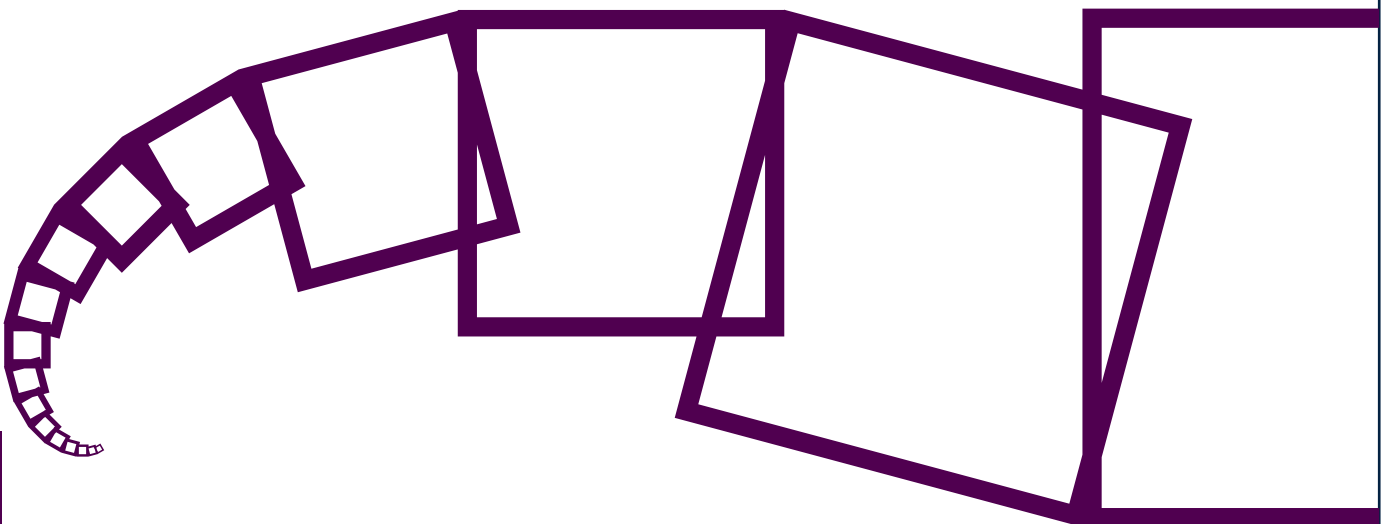
Theory and Algorithms

1. *Predictions for Covid-19 Trajectory* (CII Foundation)
   Dr. Manindra Agrawal
2. *Algebraic Circuits: Learning the Inherent Structure* (SERB)
   Dr. Nitin Saxena

Systems, Cybersecurity and Cyber-physical Systems

1. *National Interdisciplinary Center for Cyber Security and Cyber Defense of Critical Infrastructures* (SERB)
   Dr. Manindra Agrawal and Dr. Sandeep Kumar Shukla
2. *Development of National Blockchain and Demonstration of Two Strategic Applications* (National Security Council Secretariat)
   Dr. Manindra Agrawal and Dr. Sandeep Kumar Shukla
3. *Operation and Maintenance of Advanced Cyber Security System and Research Center at NHAI* (NHAI)
   Dr. Manindra Agrawal and Dr. Sandeep Kumar Shukla
4. *Providing Guidance on Technical Aspects to the RBI* (RBI)
   Dr. Sandeep Kumar Shukla
5. *Automated Synthesis of Motion Plans for Large Scale Multi-Robot Systems from Complex Specifications* (DRDO JCBCAT)
   Dr. Indranil Saha
6. *Formal Verification of Autopilot Software for UAVs* (IFCPAR)
   Dr. Indranil Saha
7. *Design of Feedback Controllers for Safe Operations of Autonomous Systems* (SERB)
   Dr. Indranil Saha
8. *Effective Sparse Matrix Vector Multiplication with Unsupervised Learning* (Intel)
   Dr. Swarnendu Biswas
9. *Digital forensics of medical devices* (GE Healthcare)
   Dr. Priyanka Bagade
10. *IoT based systems for detection of leakages and water distribution* (National Jal Jeevan Mission)
    Dr. Priyanka Bagade
11. *Optimal Online Data Analysis And Visualization of Weather Simulations at Exascale* (SERB)
    Dr. Preeti Malakar

Systems, Cybersecurity and Cyber-physical Systems (continued)

12. *Developing Safe and Secure Autonomous Cyber-Physical Systems* (MHRD SPARC)
    Dr. Indranil Saha
13. *Radio Transceiver Assisted EM Side Channel Attack on Crypto Core and Screen Gleaning Using Deep Learning* (DRDO)
    Dr. Urbi Chatterjee and Dr. Sandeep Kumar Shukla
14. *P3-AID: PUF based Privacy Preserving Authentication for Internet of Drones* (SERB)
    Dr. Urbi Chatterjee
15. *Constructing On-chip Leakage Monitor and Countermeasure to Prevent Conventional and Machine-Learning Assisted Side-Channel Attacks on Cryptosystems* (SERB)
    Dr. Debapriya Basu Roy
16. *Constructing On-Chip Leakage* (SERB)
    Dr. Debapriya Basu Roy
17. *Physical attacks on post-quantum cryptography*
    Dr. Angshuman Karmakar
18. *Privacy-preserving applications using computation on encrypted data*
    Dr. Angshuman Karmakar
19. *Design and implementation of post-quantum cryptography*
    Dr. Angshuman Karmakar

AI and Data Science

1. *SATHEE - Self Assessment, Test, and Help for Entrance Examination* (National Testing Agency)
   Dr. Amey Karkare
2. *Characterizing the Evolution of Naming Conventions in India* (SERB)
   Dr. Nisheeth Srivastava
3. *Upgrading DARPG Information Systems* (Department Of Administrative Reforms & Public Grievances)
   Dr. Nisheeth Srivastava
4. *Bridging the Genomic and Transcriptional Heterogeneity in Oral Cancer for Identifying Clinically Relevant Features* (DBT)
   Dr. Hamim Zafar
5. *Web-scale Federated Learning* (Google Research)
   Dr. Piyush Rai and Dr. Purushottam Kar

Select R&D Projects

AI and Data Science (continued)

6. *Continual Semi-supervised Multitask Learning* (Qualcomm)
    Dr. Piyush Rai
7. *Virtual Center for Extreme Classification* (Microsoft Research)
    Dr. Purushottam Kar and Dr. Piyush Rai
8. *Automatic code generation for computer vision applications* (Intel Corporation)
    Dr. Priyanka Bagade
9. *Reconstructing Cell Lineage, Invariant and Variable Lineage Maps by Integrating Mutation and Transcriptomatic Data from Dynamic Lineage Tracing Experiments* (SERB)
    Dr. Hamim Zafar
10. *Python Data Collection* (Microsoft Research)
    Dr. Amey Karkare
11. *RAA Labs for Samagra Shiksha Delhi* (UEE MISSION, Delhi Govt.)
    Dr. Amey Karkare
12. *Automated Question-Answering Systems for Ramayana* (AICTE)
    Dr. Arnab Bhattacharya
13. *Centre for Sanskrit Studies* (Ministry of Education)
    Dr. Arnab Bhattacharya
14. *Dynamic Hyperlocal Source Apportionment* (Clean Air Fund)
    Dr. Purushottam Kar and Dr. Sachchida Nand Tripathi
15. *DHSA at Kanpur* (RITES)
    Dr. Purushottam Kar and Dr. Sachchida Nand Tripathi
16. *Affective Machines: A Multimodal Approach for Creating Humane Machines* (SERB)
    Dr. Ashutosh Modi
17. *Differentiation and Diagnosis of Crohn's Disease and Intestinal Tuberculosis using CT-scan images* (SGPGI Hospital, Lucknow)
    Dr. Priyanka Bagade
18. *Short and Long-Term Fog Predictions Using Data Science* (MHRD)
    Dr. Arnab Bhattacharya, Dr. Mahendra Verma and Dr. Shivam Tripathi
19. *Development of a machine learning model to detect and classify errors and security vulnerability generated from different ECUs of a car* (Mercedes-Benz R&D)
    Dr. Urbi Chatterjee and Dr. Priyanka Bagade

AI and Data Science (continued)

20. *Text-To-Text Translation Among Indian Languages Using Sanskrit-based Interlingua Representation* (MEITY)
    Dr. Arnab Bhattacharya
21. *AI based monitoring of Calls* (Convin.AI)
    Dr. Ashutosh Modi
22. *Development of natural language interfaces for SQL databases* (Intuit Inc.)
    Dr. Ashutosh Modi
23. *Biomedical NLP* (Elucidata)
    Dr. Ashutosh Modi
24. *Anomaly Detection in Exam Logs* (Ernst & Young)
    Dr. Nisheeth Srivastava
25. *NLP Technologies for Judgement Database* (Digi e-Books)
    Dr. Ashutosh Modi
26. *Creation of Science and Technology Content for Indic Wikipedia by IIT Kanpur* (DST)
    Dr. Arnab Bhattacharya and Dr. T. V. Prabhakar

Select Publications
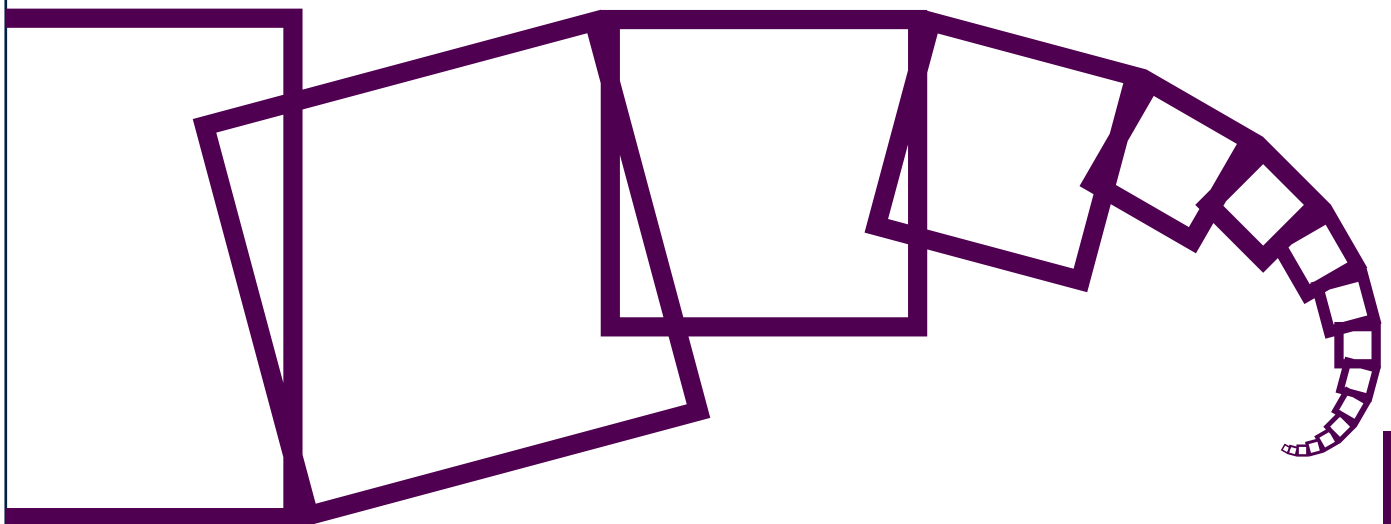
Theory and Algorithms

1. Separated borders: Exponential-gap fanin-hierarchy theorem for approximative depth-3 circuits, Pranjal Dutta, Nitin Saxena, FOCS 2022, 2022.
2. Subin Pulari and Satyadev Nandakumar, Real numbers equally compressible in every base, 40th Symposium on Theoretical Aspects of Computer Science, Hamburg, 2023.
3. minimum+1 (s,t)-cuts and dual edge sensitivity oracle, Surender Baswana, Koustav Bhanja, Abhyuday Pandey, 49th EATCS International Colloquium on Automata, Languages, and Programming (ICALP), 2022.
4. Dynamic Meta-theorems for Distance and Matching, Samir Datta, Chetan Gupta, Rahul Jain, Anish Mukherjee, Vimal Raj Sharma, Raghunath Tewari, 49th EATCS International Colloquium on Automata, Languages, and Programming (ICALP), 2022.
5. Subin Pulari, Akhil S and Satyadev Nandakumar, Finite-State Relative Dimension and the Dimensions of AP Subsequences, 17th Annual Conference on Theory and Applications of Models of Computation (TAMC) 2022, Tianjin, China, 2022.
6. Subin Pulari and Satyadev Nandakumar, Ergodic theorems and converses for PSPACE functions, Theory of Computing Systems (accepted for publication).
7. Explicit construction of q + 1 regular local Ramanujan graphs, for almost all prime-powers q, Rishabh Batra, Nitin Saxena, Devansh Shringi, Computational Complexity Journal, 2022.
8. Improved lower bound, and proof barrier, for constant depth algebraic circuits, Bhargav C S, Sagnik Dutta, Nitin Saxena, MFCS, 2022.
9. Normality, Randomness and Kolmogorov Complexity of Continued Fractions, Prateek Vishnoi, The 17th Annual Conference on Theory and Applications of Models of Computation, 2022.
10. Derandomization via symmetric polytopes: Poly-time factorization of certain sparse polynomials, Pranav Bisht, Nitin Saxena, 42nd IARCS Foundations of Software Technology and Theoretical Computer Science (FSTTCS), 2022.
11. An effective description of the roots of multivariates mod p^k and the related Igusa's local zeta function, Sayak Chakrabarti, Nitin Saxena, 48th International Symposium on Symbolic and Algebraic Computation (ISSAC), 2023.

Systems, Cybersecurity and Cyber-physical Systems

1. A Scalable Shannon Entropy Estimator, Priyanka Golia, Brendan Juba, Kuldeep S. Meel, 34th International Conference on Computer Aided Verification (CAV), 2022.
2. STL-Based Synthesis of Feedback Controllers Using Reinforcement Learning, Nikhil Kumar Singh, Indranil Saha, AAAI, 2023.
3. A. Mukherjee and P. Malakar, "A Deep Learning-Based In Situ Analysis Framework for Tropical Cyclogenesis Prediction," 2022 IEEE 29th International Conference on High Performance Computing, Data, and Analytics (HiPC), 2022.
4. On Quantitative Testing of Uniform Samplers, Mate Soos, Priyanka Golia, Sourav Chakraborty, Kuldeep S. Meel, The 28th International Conference on Principles and Practice of Constraint Programming (CP), 2022.
5. Dhaval Gujarathi and Indranil Saha. MT*: Multi-Robot Path Planning for Temporal Logic Specifications. IROS 2022.
6. Amit Dhyani and Indranil Saha. Temporal Logic Path Planning under Localization Uncertainty. IROS 2022.
7. Ratijit Mitra and Indranil Saha. Scalable Online Coverage Path Planning for Multi-Robot Systems. IROS 2022.
8. Nikhil Kumar Singh and Indranil Saha. STL-Based Synthesis of Feedback Controllers Using Reinforcement Learning. AAAI 2023.
9. Synthesis with Explicit Dependencies, Priyanka Golia, Subhajit Roy, Kuldeep S. Meel, Design, Automation and Test in Europe Conference (DATE), 2023.
10. Aiding to Multimedia Accelerators: A Hardware Design for Efficient Rounding of Binary Floating Point Numbers, Mahendra Rathore, Vishesh Mishra, Urbi Chatterjee, Design, Automation and Test in Europe Conference (DATE), 2023.
11. K. Mohan, P. Bagade, Digital twin for electric vehicle battery management with incremental learning, International Journal for Expert Systems with Applications, Elsevier, 2023.
12. T. Kiran, P. Bagade, GAN-AE: An Unsupervised Intrusion Detection System for MQTT Networks, International Journal for Engineering Applications of Artificial Intelligence, Elsevier, 2023. (Accepted for publication)
13. K. Mohan, P. Bagade, Electric Vehicle Battery Management using Digital Twin, IEEE COINS conference, 2022, Spain.

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14. A. Mishra, S. Saha, S. Mishra, and P. Bagade. A federated learning approach for smart healthcare systems. CSI Transactions on ICT (2023).

15. A. Mishra, P. Bagade, Investigating IoT Systems Security Attacks using Network Forensics, 15th International Conference on Communication Systems & Networks, COMSNETS 2023, Cyber Security and Privacy Workshop, Bangalore, India.

16. A. Mishra, P. Bagade, Digital Forensics for Medical Internet of Things, IEEE Global Communications Conference, GLOBECOM 2022: Workshop on Edge-AI and IoT for connected health, Rio de Janeiro, Brazil.

17. N. Rani, A. Mishra, R. Kumar, S. Ghosh, S. Shukla, P. Bagade, A Generalized Unknown Malware Classification, 18th EAI Securecomm 2022: Workshop on Security and Privacy-preserving solutions in the Internet of Things (S/P-IoT), Kansas City, USA.

18. T. Kiran, P. Bagade, Security risks in MQTT-based Industrial IoT Applications, IEEE COINS conference, 2022, Spain.

19. Levent Aksoy, Debapriya Basu Roy, Malik Imran, Patrick Karl, Samuel Pagliarini: Multiplierless Design of Very Large Constant Multiplications in Cryptography. IEEE Trans. Circuits Syst. II Express Briefs 69(11): 4503-4507 (2022).

20. Tim Fritzmann, Michiel Van Beirendonck, Debapriya Basu Roy, Patrick Karl, Thomas Schamberger, Ingrid Verbauwhede, Georg Sigl: Masked Accelerators and Instruction Set Extensions for Post-Quantum Cryptography. IACR Trans. Cryptogr. Hardw. Embed. Syst. 2022(1): 414-460 (2022).

21. Piyush Beegala, Debapriya Basu Roy, Prasanna Ravi, Shivam Bhasin, Anupam Chattopadhyay, Debdeep Mukhopadhyay: Efficient Loop Abort Fault Attacks on Supersingular Isogeny based Key Exchange (SIKE). DFT 2022: 1-6.

22. K. Pratihar, U. Chatterjee, M. Alam, R. S. Chakraborty and D. Mukhopadhyay, "Birds of the Same Feather Flock Together: A Dual-Mode Circuit Candidate for Strong PUF-TRNG Functionalities," in IEEE Transactions on Computers, vol. 72, no. 6, pp. 1636-1651, 1 June 2023.

23. A. Agrawal, U. Chatterjee and R. R. Maiti, "CheckShake: Passively Detecting Anomaly in Wi-Fi Security Handshake using Gradient Boosting based Ensemble Learning," in IEEE Transactions on Dependable and Secure Computing.

Systems, Cybersecurity and Cyber-physical Systems (continued)

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25. Nimish Mishra, Anirban Chakraborty, Urbi Chatterjee, and Debdeep Mukhopadhyay. 2023. Time's a Thief of Memory: Breaking Multi-tenant Isolation in TrustZones Through Timing Based Bidirectional Covert Channels. In Smart Card Research and Advanced Applications: 21st International Conference, CARDIS 2022.

26. Anand Agrawal, Urbi Chatterjee, and Rajib Ranjan Maiti. 2022. KTRACKER: Passively Tracking KRACK using ML Model. In Proceedings of the Twelfth ACM Conference on Data and Application Security and Privacy (CODASPY '22).

27. Aakash and Indranil Saha. It Costs to Get Costs! A Heuristic-Based Scalable Goal Assignment Algorithm for Multi-Robot Systems. ICAPS 2022.

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29. Arvind Adimoolam, Indranil Saha, and Thao Dang. Safe Self Triggered Control Based on Precomputed Reachability Sequences. HSCC 2023.

30. P. Pradeep Kumar, K. Kant and A. Pal, "C-FAR: A Compositional Framework for Anomaly Resolution in Intelligent Transportation Systems," in IEEE Transactions on Intelligent Transportation Systems, vol. 24, no. 1, pp. 1015-1024, Jan. 2023.

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Systems, Cybersecurity and Cyber-physical Systems (continued)

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34. P. P. Kumar, K. Kant and A. Pal, "Managing Access Control in Large-Scale Multi-party IoT Systems," 2022 22nd IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGrid), Taormina, Italy, 2022.

35. R. K. Gulati, S. Islam, A. Pal, K. Kant and A. Kim, "Characterization of Magnetic Communication Through Human Body," 2022 IEEE 19th Annual Consumer Communications & Networking Conference (CCNC), Las Vegas, NV, USA, 2022.

36. R. K. G. Walia, K. Kant and A. Pal, "Ultrasonic vs. Magnetic Resonance Communication for Mixed Wearable and Implanted Devices," ICC 2022 - IEEE International Conference on Communications, Seoul, Korea, Republic of, 2022.

37. X. Zhang, M. Li, A. Hilton, A. Pal, S. Dey and S. Debroy, "End-to-End Latency Optimization of Multi-view 3D Reconstruction for Disaster Response," 2022 10th IEEE International Conference on Mobile Cloud Computing, Services, and Engineering (MobileCloud), San Francisco, CA, USA, 2022.

38. Area–Time Efficient Implementation of NIST Lightweight Hash Functions Targeting IoT Application, Safiullah Khan, Wai-Kong Lee, Angshuman Karmakar, Jose Maria Bermudo Mera, Abdul Majeed, Seong Oun Hwang. IEEE Internet of Things Journal, 2023.

39. A fast RLWE-based IPFE library and its application to privacy-preserving biometric authentication, Supriya Adhikary, Angshuman Karmakar, IEEE Transactions on Emerging Topics in Computing.

40. A 334 - µW 0.158 - mm2 ASIC for Post-Quantum Key-Encapsulation Mechanism Saber With Low-Latency Striding Toom–Cook Multiplication. Archisman Ghosh,Jose Maria Bermudo Mera, Angshuman Karmakar, Debayan Das, Santosh Ghosh, Ingrid Verbauwhede, Shreyas Sen. IEEE Journal of Solid-State Circuits, 2023.

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Systems, Cybersecurity and Cyber-physical Systems (continued)

42. Efficient Data Race Detection of Async-Finish Programs Using Vector Clocks, Shivam Kumar, Anupam Agrawal, and Swarnendu Biswas, International Workshop on Programming Models and Applications for Multicores and Manycores, 2022.

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45. PAKAMAC: A PUF-based Keyless Automotive Entry System with Mutual Authentication, Swapnil Gade, Urbi Chatterjee, Debdeep Mukhopadhyay, Springer Journal of Hardware and Systems Security (JHASS) 2022, 2022.

46. Is the Whole lesser than its Parts? Breaking an Aggregation based Privacy aware Metering Algorithm, Soumyadyuti Ghosh, Urbi Chatterjee, Rumia Masburah, Soumyajit Dey and Debdeep Mukhopadhyay, Euromicro Conference on Digital Systems Design 2022, Special Session on Safety, Security and Privacy of Cyber-Physical Systems, 2022.

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49. Dual-Tone Multi-Frequency Assisted Acoustic Side Channel Attack to Retrieve Dialled Call Log, Abhishek Revskar, Mahendra Rathor, Urbi Chatterjee, 12th International Conference on Security, Privacy and Applied Cryptographic Engineering (SPACE) 2022, 2022.

AI and Data Science

1. A Probabilistic Framework for Lifelong Test-Time Adaptation, Dhanajit Brahma, Piyush Rai, Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

2. Abhinav Joshi, Areeb Ahmad, Umang Pandey, and Ashutosh Modi, "ScriptWorld: A Text Based Environment for Learning Procedural Knowledge," in Proceedings of the Thirty-Second International Joint Conference on Artificial Intelligence, IJCAI-22, Main Track, International Joint Conferences on Artificial Intelligence Organization, Aug. 2023.

3. Corruption-tolerant Algorithms for Generalized Linear Models, Bhaskar Mukhoty, Debojyoti Dey, Purushottam Kar, 31st AAAI Conference on Artificial Intelligence (AAAI), 2023.

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5. Deep Encoders with Auxiliary Parameters for Extreme Classification, Kunal Dahiya, Sachin Yadav, Sushant Sondhi, Purushottam Kar, et al, 29th ACM SIGKDD Conference On Knowledge Discovery And Data Mining (KDD), 2023.

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7. Tushar Verma, Atul Shree, and Ashutosh Modi, "ASR for Low Resource and Multilingual Noisy Code-Mixed Speech," in Proc. Interspeech 2023, 2023.

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9. Abhinav Joshi, Susmit Agarwal, and Ashutosh Modi, "ISLTranslate: Dataset for Translating Indian Sign Language," in Findings of the 61st Annual Meeting of the Association for Computational Linguistics (ACL), Jul. 2023.

Select Publications

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5. Abhinav Joshi, Akshat Sharma, Sai Kiran Tanikella, and Ashutosh Modi, "U-CREAT: Unsupervised Case Retrieval using Events extrAcTion," in 61st Annual Meeting of the Association for Computational Linguistics, Toronto, Canada: Association for Computational Linguistics (ACL), Jul. 2023.

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7. Abhinav Joshi, Ashwani Bhat, Pradeep S, Priya Gole, Shashwat Gupta, Shreyansh Agarwal, and Ashutosh Modi, "CISLR: Corpus for Indian Sign Language recognition," in Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing, Abu Dhabi, United Arab Emirates: Association for Computational Linguistics, Dec. 2022, pp. 10 357–10 366.

8. Ashwani Bhat and Ashutosh Modi, "Multi-task learning framework for extracting emotion cause span and entailment in conversations," in Proceedings of The 1st Transfer Learning for Natural Language Processing Workshop, ser. Proceedings of Machine Learning Research, vol. 203, PMLR, 2023, pp. 33–51.

9. Mukund Chaudhry Chaudhry, Arman Kazmi, Shashank Jatav, Akhilesh Verma, Vishal Samal, Kristopher Paul, and Ashutosh Modi, "Reducing inference time of biomedical NER tasks using multi-task learning," in Proceedings of the 19th International Conference on Natural Language Processing (ICON), New Delhi, India: Association for Computational Linguistics, Dec. 2022, pp. 116–122.

10. Vijit Malik, Rishabh Sanjay, Shouvik Kumar Guha, Angshuman Hazarika, Shubham Nigam, Arnab Bhattacharya, and Ashutosh Modi, "Semantic segmentation of legal documents via rhetorical roles," in Proceedings of the Natural Legal Language Processing Workshop, EMNLP 2022, Abu Dhabi, United Arab Emirates (Hybrid): Association for Computational Linguistics, Dec. 2022, pp. 153–171.

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13. Selecting between visuomotor lotteries to measure mental effort in risky decisions, Samarth Mehrotra, Nisheeth Srivastava, Proceedings of CogSci, 2022.
14. Abhinav Joshi, Naman Gupta, Jinang Shah, Binod Bhattarai, Ashutosh Modi, and Stoyanov Danail, "Generalized Product-of-Experts for Learning Multimodal Representations in Noisy Environments," in International Conference on Multimodal Interactions (ICMI), Bengaluru, India.: Association for Computing Machinery (ACM), 2022.
15. Keshav Bansal, Harsh Agarwal, Abhinav Joshi, and Ashutosh Modi, "Shapes of emotions: Multimodal emotion recognition in conversations via emotion shifts," in Proceedings of the First Workshop on Performance and Interpretability Evaluations of Multimodal, Multipurpose, Massive Scale Models, Virtual: International Conference on Computational Linguistics (COLING), Oct. 2022, pp. 44–56.
16. Abhinav Joshi, Ashwani Bhat, Ayush Jain, Atin Vikram Singh, and Ashutosh Modi, "COGMEN: COntextualized GNN based Multimodal Emotion recognitioN," in North American Chapter of the Association for Computational Linguistics (NAACL), Seattle, U.S.A.: Association for Computational Linguistics (ACL), 2022.
17. Prathamesh Kalamkar, Aman Tiwari, Astha Agarwal, Saurabh Karn, Smita Gupta, Vivek Raghavan, and Ashutosh Modi, "Corpus for automatic structuring of legal documents," in Proceedings of the Language Resources and Evaluation Conference (LREC), Marseille, France: European Language Resources Association, 2022, 4420-4429.
18. Arnav Arnav Kapoor, Mudit Dhawan, Anmol Goel, Arjun T.H., Akshala Bhatnagar, Vibhu Agrawal, Amul Agrawal, Arnab Bhattacharya, Ponnurangam Kumaraguru, and Ashutosh Modi, "HLDC: Hindi Legal Documents Corpus," in Findings of the Association for Computational Linguistics (ACL), Dublin, Ireland (Online): Association for Computational Linguistics, 2022, pp. 3521–3536.
19. Ishika Singh, Gargi Singh, and Ashutosh Modi, "Pre-trained Language Models as Prior Knowledge for Playing Text-based Games," in Proceedings of the 21st International Conference on Autonomous Agents and MultiAgent Systems (AAMAS), Aukland, NZ (Online): International Foundation for Autonomous Agents and Multiagent Systems, 2022, pp. 1729–1731.

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20. Makadi: A Large-Scale Human-Labeled Dataset for Hindi Semantic Parsing, Shashwat Vaibhav, Nisheeth Srivastava, WILDRE@LREC, 2022.
21. Over-precise predictions cannot identify good choice models, Anjali Sifar, Nisheeth Srivastava, Computational Brain and Behavior, 2022.
22. Adaptive real-time diversification of digital content, Tushar Shandhilya, Nisheeth Srivastava, The 2nd International Workshop on Online and Adaptive Recommender Systems, OARS-KDD, 2022.
23. LEGenT: Localizing Errors and Generating Testcases for CS1, Nimisha Agarwal, Amey Karkare, L@S '22: Ninth (2022) ACM Conference on Learning @ Scale Proceedings, 2022.
24. Sampling-based probability construction explains individual differences in risk preference, Ankoju Bhanu Prakash, Nisheeth Srivastava, Proceedings of CogSci, 2022.
25. Prutor: an intelligent learning and management system for programming courses, Amey Karkare, Purushottam Kar, Communications of the ACM, 2022.
26. Advances in Automated Pedagogical Error Repair, Sharath H. Padmanabha, Fahad Shaikh, Mayank Bansal, Debanjan Chatterjee, Preeti Singh, Amey Karkare, Purushottam Kar, 16th Innovations in Software Engineering Conference (ISEC), 2023.
27. PRIORITY: An Intelligent Problem Indicator Repository, Sharath H. Padmanabha, Fahad Shaikh, Mayank Bansal, Debanjan Chatterjee, Preeti Singh, Amey Karkare, Purushottam Kar, 16th Innovations in Software Engineering Conference (ISEC), 2023.
28. Gradient Perturbation-based Efficient Deep Ensembles, Amit Chandak, Purushottam Kar, Piyush Rai, 10th ACM IKDD Conference on Data Science (CODS), 2023.
29. Personalized Retrieval over Millions of Items, Hemanth Vemuri, Sheshansh Agrawal, Shivam Mittal, Purushottam Kar, et al., 46th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), 2023.

Invited Talks and Seminars
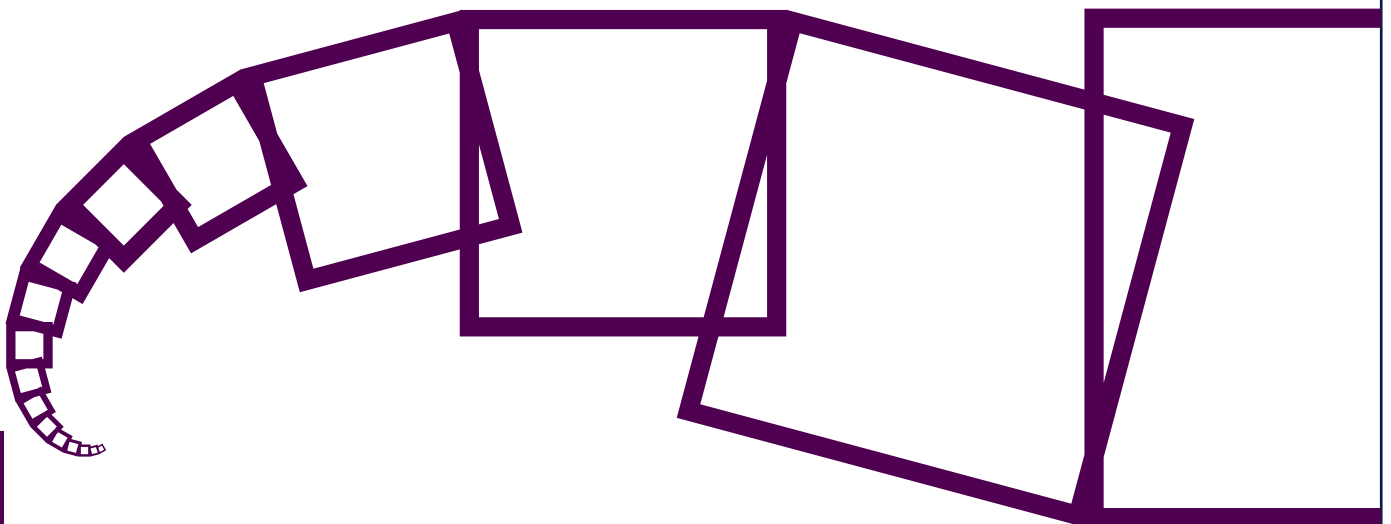
Theory and Algorithms

Title: *Are Lattice problems really that hard?*
Speaker: Dr. Rajendra Kumar, NUS
Date: April 20th, 2022

Title: *How to Store Elephants?*
Speaker: Dr. Manish K Gupta, Dhirubhai Ambani IICT
Date: July 28th, 2022

Title: *Drawing Graphs on the Grid: How Easy Is It?*
Speaker: Dr. Siddharth Gupta, University of Warwick
Date: January 16th, 2023

Title: *Non-Turing machines: Stochastic and probabilistic learning circuits*
Speaker: Dr. Sandip Tiwari, Cornell University
Date: February 6th, 2023

Systems, Cybersecurity and Cyber-physical Systems

Title: *Criminal Justice in India: Reality & Possibility*
Speaker: Dr. Arvind Verma, Indiana University
Date: August 1st, 2022

Title: *The Power of Bitcoin and P2P Micropayments in an IoT World*
Speaker: Dr. Craig Wright, nChain
Date: August 9th, 2022

Title: *Machine Learning in Hardware Security*
Speaker: Dr. Urbi Chatterjee, IIT Kanpur
Date: September 7th, 2022

Title: *VLSI Architectures for Training Deep Neural Networks and Homomorphic Encryption*
Speaker: Dr. Keshab K Parhi, University of Minnesota, Minneapolis
Date: December 1st, 2022

Systems and Architecture (continued)

Title: *Understanding Performance of Internet Video using Network Measurement Data*
Speaker: Dr. Tarun Mangla, University of Chicago
Date: February 20th, 2023

Title: *Distributing Trust to Build Data-Leak-Proof Systems*
Speaker: Dr. Adithya Vadapalli, University of Waterloo
Date: February 27th, 2023

AI and Data Science

Title: *Optimization and Sampling Under Symmetry*
Speaker: Dr. Nisheeth Vishnoi, Yale University
Date: June 23rd, 2022

Title: *AI for Social Impact: Learnings from Tuberculosis Elimination Program in India*
Speaker: Dr. Jithin K. Sreedharan, IIT Kanpur
Date: August 24th, 2022

Title: *Machine Learning in Single-cell Genomics*
Speaker: Dr. Hamim Zafar, IIT Kanpur
Date: September 28th, 2022

Title: *From Brain to AI/ML and Back*
Speaker: Dr. Ambuj K. Singh, University of California, Santa Barbara
Date: October 19th, 2022

Title: *Leveraging AI for Smart Transportation*
Speaker: Dr. Sanjay Ranka, University of Florida
Date: November 1st, 2022

Title: *Automating Commonsense Reasoning*
Speaker: Dr. Gopal Gupta, The University of Texas at Dallas
Date: November 28th, 2022

Invited Talks and Seminars

Acknowledgments

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